

REMARKS

Claim Rejections under 35 USC § 101 and 35 USC § 112, first paragraph

The Examiner rejected claim 1 under 35 USC § 101 and 35 USC § 112, first paragraph stating that the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility. In particular, the Examiner states:

There is no disclosure provided within the instant specification on what specific function the protein of SEQ ID NO:1 possesses, or how to specifically assay for such, ligands that bind, promoter that activate; nor are any cell types/tissues disclosed that specifically nor are any disease states disclosed that are directly related to said protein dysfunction.

The specification fails to disclose, what disease is associated with claimed sodium phosphate co-transporter dysfunction or what drugs affect specific claimed sodium phosphate co-transporter function.

Office Action page 4, line 21 – page 5, line 5. Applicants respectfully disagree with these contentions.

The specification clearly states the function of the Npt2B polypeptide of the subject invention, which is, a sodium phosphate co-transporter expressed in intestinal epithelial cells that is responsible for absorption and uptake of phosphate in the intestine (page 4 line 9; page 2 line 14). The specification also discloses specific diseases associated with the polypeptide of the subject invention, which are “diseases characterized by abnormally high phosphate absorption”, which are “characterized by the presence of hyperphosphatemia and include: hyperparathyroidism, hypocalcemia, vitamin D deficiency, soft tissue or metastatic calcification,” and especially, “hyperphosphatemia resulting from renal insufficiency”, as well as “disease conditions characterized by abnormally low phosphate absorption ... characterized by the presence of hypophosphatemia, and include: osteomalacia, hypocalciurea, rickets, and the like” (page 27 lines 20-29). Accordingly, Applicants have explicitly set forth a specific utility for the Npt2B polypeptide of the subject invention.

To further support Applicants' assertion that the polypeptide of the subject invention has both a specific and substantial utility, as well as a well established utility, Applicants submit a Declaration under 37 CFR §1.132 by Dr. Suryanarayana Sankuratri, attached hereto as Exhibit 1, together with six figures and a 2003 article by Pearce et al (*Biochem Biophys Res Commun.* 301: 8-12, 2003). The attached Declaration shows that using the procedures disclosed in the specification (exemplified in page 29 line 25 to page 30 line 19), the Npt2B polypeptide of the subject invention was functionally expressed in a mammalian cell line and was shown not only to transport phosphate ions but also to possess characteristics as determined by kinetics, pH dependence and tissue expression that clearly identify it as the transporter responsible for phosphate absorption in the intestine. Recent articles and reviews (in which Npt2B is referred to as NaPi-IIB, see Xu et al., *Biochim Biophys Acta* 1567: 97-105, 2002, Werner & Kinne, *J Physiol Regul Integr Comp Physiol.* 280(2):R301-312, 2001) confirm Applicants' statements on the functionalities of Npt2B, and the Declaration asserts that "(i)t is now well-established in the scientific community that Npt2B (which is equivalent to NaPi-IIB) is the protein involved in intestinal sodium-dependent phosphate absorption." Applicants have therefore demonstrated a well established utility for the claimed invention.

The attached Declaration further establishes that "the use of Npt2B in a screening assay to identify inhibitors of the transporter would be of significant importance" in the treatment of the diseases characterized by abnormally high phosphate absorption, which were listed previously. In fact, a number of such inhibitors were identified (see Fig. 6 in attached Declaration). Applicants have therefore demonstrated a substantial, real-world utility for the Npt2B polypeptide of the subject invention.

The Npt2B polypeptide of the subject invention is in fact unique, as it is the protein primarily responsible for dietary intake of phosphate. Thus, only modulation of this protein will result in alteration of the amount of phosphate that enters the system. Thus, the utility of the present invention is both specific and substantial. Applicants assert that no ligands need to be disclosed in the instant application, as the pending claim does not relate to methods of treatment. Further, assay and screening methods are known in the art, and need not be repeated here. Applicants also assert that for the reasons set forth above, the specification clearly sets forth both

specific and substantial utility and enables one skilled in the art to make and use the Npt2B polypeptide of the subject invention.

From the above, it can be seen that the claimed invention is fully supported by both a specific and substantial utility as well as a well established utility and Applicants respectfully request the outstanding rejection of claim 1 under 35 USC § 101 and 35 USC § 112, first paragraph be withdrawn.

Objections

A. Headings

Applicants have amended the reference to the Figures as requested, but point out that MPEP§ 608.01(f) does not require such and in fact does not mention headings at all.

B. Description of the figures

Applicants have not amended the description of Figure 2 in the Brief Description of Drawings as Figures 2A-B as requested because this is contrary to what is stated in MPEP§ 608.01(f) which reads, "If a figure contains several parts, for example, figure 1A, 1B, and 1C, the figure may be described as figure 1."

Cannon et al.
Application Serial No. 10/052,664
Page 7

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. Objections to the heading and to the drawings have been corrected. The issuance of a formal Notice of Allowance at an early date is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-855-5316.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'David J. Chang', with a stylized flourish at the end.

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